Claims

1. An apparatus for coating outer peripheral surface of a pillar structure which is provided with a holding means which holds the pillar structure in nearly vertical direction and rotates together with the held pillar structure on an axis of nearly vertical direction as a common rotating axis, a supplying and coating means which is disposed at a given position with respect to the outer peripheral surface of the pillar structure and supplies a coating material to the outer peripheral surface of the rotating pillar structure and coats the coating material on the outer peripheral surface, and a smoothing means which smoothes the coating surface of the coating material supplied to and coated on the outer peripheral surface, wherein the supplying and coating means has a nozzle having an opening in the form of a slit for supplying the coating material toward the outer peripheral surface and coating the coating material thereon and the opening of the nozzle is disposed in nearly vertical direction with the position of the upper end of the opening being nearly the same as the position of the upper end of the pillar structure and has a length in longer direction which is shorter than the length between the both ends of the pillar structure, and the smoothing means has a length in longer direction which is not shorter than the length between the both ends of the pillar structure and is disposed in nearly vertical direction in such a state as keeping a given distance from the outer peripheral surface or contacting with the outer peripheral surface, and wherein the coating material is

supplied from the opening of the nozzle to the upper side of the outer peripheral surface of the pillar structure and coated thereon, and the coating surface of the coating material supplied and coated is smoothed between the outer peripheral surface and the longer side end portion of the smoothing means to form a uniform coating surface on the whole outer peripheral surface of the pillar structure.

2. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 1, wherein the length of the opening of the nozzle in longer direction is 30-80% of the length between the both ends of the pillar structure.

3. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 1 or 2, wherein the holding means has a pedestal which holds the pillar structure in the vertical direction placed thereon with one end thereof facing downward.

4. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 3, wherein the holding means has a cam which presses downwardly another end of the pillar structure held on the pedestal and rotates on the axis of the nearly vertical direction as a common rotating axis.

5. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 4, wherein the outer peripheral shape of the pedestal and that of the cam are nearly the same.

6. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 3-5 which is further provided with a centering means which holds the

pillar structure and the pedestal and/or the cam in a given positional relation.

7. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 3-6 which is further provided with a following means which drives the smoothing means following the outer periphery of the pedestal and/or the cam so that the smoothing means is disposed at a given position with respect to the outer peripheral surface of the pillar structure.

8. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 7, wherein the following means has first and second following rollers which are disposed at a given distance from each other and move backward and forward following the outer periphery of the cam while contacting with the outer periphery of the cam together with the supplying and coating means and the smoothing means, and the first and second following rollers are disposed so that the angle formed by a line passing through the centers of the respective rollers and the smoothing means is a given angle.

9. An apparatus for coating the outer peripheral surface of a pillar structure according to claim 8, wherein the following means further has third and fourth following rollers which move backward and forward following the outer periphery of the pedestal while contacting with the outer periphery of the pedestal together with the supplying and coating means and the smoothing means, and the rotating axis of the third following roller and that of the first following roller are common and the rotating axis of the fourth following roller and

that of the second following roller are common.

10. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 3-9, wherein the outer periphery of the pedestal and/or the cam comprise stainless steel or ceramics.

11. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-10, wherein the smoothing means comprises stainless steel or wear-resistant ceramics.

12. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-11, wherein the shape of a section of the pillar structure cut along a plane perpendicular to the direction of the central axis of the pillar structure is circular or elliptical.

13. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-12, wherein the pillar structure is a honeycomb structure comprising a plurality of cells which serve as flow paths for fluid.

14. An apparatus for coating the outer peripheral surface of a pillar structure according to any one of claims 1-13, wherein the supplying and coating means and the smoothing means can rotate together along the outer periphery of the pillar structure.

15. A method for coating outer peripheral surface of a pillar structure using the apparatus for coating the outer peripheral surface of a pillar structure of any one of claims 1-14 which comprises holding the pillar structure by the holding

means, supplying a coating material from the supplying and coating means on the outer peripheral surface of the pillar structure and coating the coating material thereon while rotating the pillar structure and the holding means on the axis of nearly vertical direction as a common rotating axis, and smoothing the coating surface of the supplied and coated coating material between the outer peripheral surface and the longer side end portion of the smoothing means.